

In re Patent Application of:
VIGIL ET AL.
Serial No. **09/840,481**
Filing Date: **April 23, 2001**
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REMARKS

Applicants would like to thank the Examiner for the thorough examination of the present application. The arguments supporting patentability of the claims are presented in detail below.

I. The Claims Are Patentable

The Examiner rejected independent Claims 25, 31, 35 and 42 over the Grabb et al. patent in view of the Lyons et al. patent.

The present invention, as recited in independent Claim 25, for example, is directed to a method for mitigating multipath in a digital television signal (DTV) that is ATSC DTV compliant. The method comprises generating a training sequence that is ATSC DTV compliant, multiplexing the training sequence with DTV data to generate a multiplexed DTV data stream with the training sequence embedded therein, and modulating the multiplexed DTV data stream for transmission. The method further comprises receiving a transmitted DTV signal, and detecting correlation peaks in the received DTV signal based upon the multiplexed training sequence embedded therein. The detected correlation peaks are used to mitigate multipath in the received DTV signal.

The present invention may advantageously mitigate multipath based upon the training sequence that is ATSC DTV compliant, and which is then modulated with the DTV data for transmission. With the training sequence embedded in the transmitted DTV signal, a receiver detects correlation peaks based upon the training sequence in the received DTV signal. The detected correlation peaks are used to mitigate multipath

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in the received DTV signal.

Independent method Claim 31 is similar to independent method Claim 25 except this claim is directed to the transmitter functions. Independent device Claim 35 is similar to independent method Claim 25, and is directed to digital television (DTV) system comprising a transmitting system and a receiving system. Independent device Claim 42 is directed to a digital television (DTV).

Referring now to the Grabb et al. patent, and to FIG. 1 in particular, a wideband overlay sequence generator **103** provides an overlay signal (i.e., reference data) that is added to the DTV signal to be transmitted. The overlay signal allows a receiver to estimate the transmission channel and allows mitigation of changing multipath conditions. In particular, periodic correlation peaks are detected in the received overlay signal received by the receiver, and the timing and magnitudes of the peaks in the received overlay signal are used to mitigate multipath in the received signal.

As correctly noted by the Examiner, the overlay signal in Grabb et al. is not a training sequence that is ATSC DTV compliant. In addition, the overlay signal is added after the DTV data has been modulated. Consequently, the Examiner correctly notes that Grabb et al. also fails to disclose that the training sequence is multiplexed with the DTV data to generate a multiplexed DTV data stream with the training sequence embedded therein, and that the multiplexed DTV data stream is modulated for transmission.

The Examiner cited the Lyons et al. patent in an attempt to address the noted deficiencies of Grabb et al. In particular, the Examiner states that Lyons et al. discloses

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that the ATSC broadcast system includes three general subsystems: source coding and compression, service multiplex and transport, and transmission. The first subsystem - source coding and compression - deals with bit reduction for the video, audio and ancillary digital data streams. The second subsystem - service multiplex and transport - deals with dividing each digital stream into "packets" and multiplexing the video stream packets, and the audio stream packets and ancillary digital data stream packets into a single transport stream. The third subsystem - transmission - deals with channel coding and modulation.

The Examiner has taken the position that it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the coder and the modulator as taught by Lyons et al. into Grabb et al. to provide reliable, efficient and affordable digital transmission systems. The Applicants respectfully submit that even if the references were combined as suggested by the Examiner, the claimed invention is still not produced.

Referring to FIG. 1 in Lyons et al., ATSC transport packets are created from compressed video, audio and data streams. Payload data, which takes the form of compressed video data at input **12**, compressed audio data at input **14** and compressed ancillary data at input **16** from packetized elementary stream (PES) encoders **10** are sent to the transport stream encoder (TSE) **20**. Unlike conventional analog NTSC television signal which utilize the concept of synch pulses whereby a clock rate can be directly derived from each picture itself, the amount of data for each picture in a compressed digital system is unavailable. Hence, a loss of

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synchronization in a compressed domain digital system can readily lead to buffer over- or underflow. To mitigate this possibility, timing or synchronization data is transmitted in select ones of the output transport packets **22**, referred to as program clock reference (PCR) packets.

The object of Lyons et al. is to simplify transport packet generation and PCR packet insertion by moving the functionality of PCR packet formation and insertion into the TSE **20**. This is accomplished by utilizing a single clock signal to generate a digital data stream for transmission in a compressed domain transmission system.

As illustrated in FIG. 1 of Lyons et al., the PCR packet is multiplexed at the output interface **60** instead of within the TSE **20** where the other packets are formed. Reference is directed to column 2, lines 29-34 of Lyons et al., which provides:

"Thus, the system requires a PCR generator **50** at the output as illustrated in FIG. 1. An independent output byte clock **70** is used to transfer the transport packet bytes from the output interface **60** to the transmission equipment using a conventional driver stage **65**, e.g., to the third subsystem." (Emphasis added.)

The Examiner contends that Lyons et al. may provide a reliable, efficient and affordable digital transmission system. However, this is based upon using a single clock signal to generate a digital data stream for transmission in a compressed domain transmission system instead of mitigating multipath, as in the claimed invention. In particular, Lyons

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et al. fails to disclose generating a training sequence that is ATSC DTV compliant, and then multiplexing the training sequence with the DTV data to generate a multiplexed DTV data stream with the training sequence embedded therein.

As noted in the above highlighted passage from Lyons et al., the compressed domain signal from the output interface **60** is provided to "transmission equipment" for transmission. Other than this general reference to transmission equipment, Lyons et al. fails to disclose modulating the multiplexed DTV data stream (with the training sequenced embedded therein) for transmission, as also recited in the claimed invention. Due to the lack of disclosure in Lyons et al. with respect to generating a training sequence that is ATSC DTV compliant, and multiplexing the training sequence with DTV data prior to modulation, the claimed invention is not produced with the selective combination of Grabb et al. in view of Lyons et al. Accordingly, it is submitted that independent Claim 25 is patentable over Grabb et al. in view of Lyons et al.


Independent Claims 31, 35 and 42 are similar to independent Claim 25. Accordingly, it is also submitted that independent Claims 31, 35 and 42 are patentable over Grabb et al. in view of Lyons et al. In view of the patentability of independent Claims 25, 31, 35 and 42, it is submitted that their dependent claims, which recite yet further distinguishing features of the invention, are also patentable. These dependent claims require no further discussion herein.

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CONCLUSION

In view of the arguments provided herein, it is submitted that all the claims are patentable. Accordingly, a Notice of Allowance is requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Respectfully submitted,



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